Center Independent Research & Development: GSFC IRAD

Developing Wide Field-of-View Suprathermal Neutral Atom Imaging Optics

Completed Technology Project (2015 - 2016)

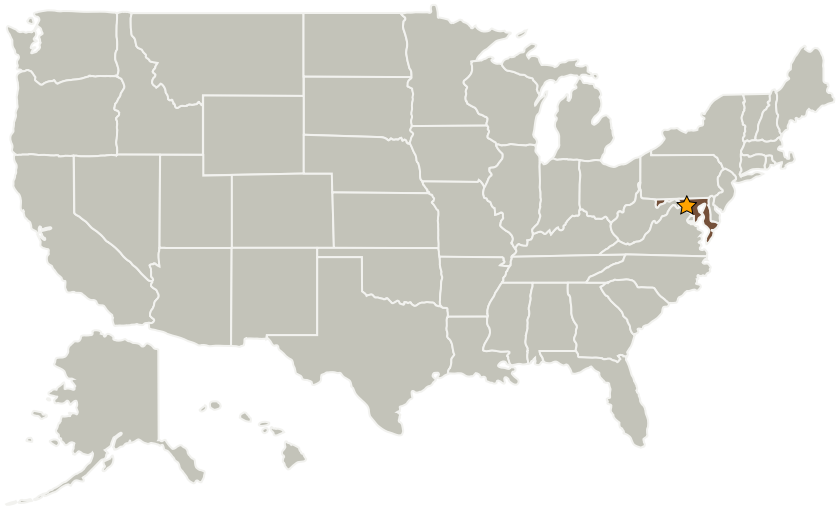
Project Introduction

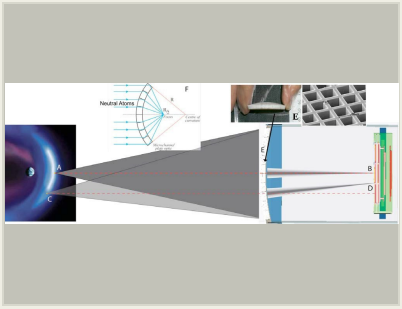
Energetic neutral atom (ENA) imaging has provided critical data on many planetary exospheres, atmospheres, and surfaces including the Moon, Mars, and Venus. However, current suprathermal neutral atom (SNA) imagers have limited fields-of-view, sometimes as small as 8-10 degrees in one direction, and a wide field-of-view low energy neutral imager does not yet exist. For this IRAD, we will develop the optics to focus SNAs and test the optics using an already-developed position sensing focal plane and a neutral beam source that has already been established for calibration of previous neutral atom imagers.

Anticipated Benefits

Energetic neutral atom (ENA) imaging has provided critical data on many planetary exospheres, atmospheres, and surfaces including the Moon, Mars, and Venus. However, current suprathermal neutral atom (SNA) imagers have limited fields-of-view, sometimes as small as 8-10 degrees in one direction, and a wide field-of-view low energy neutral imager does not yet exist. For this IRAD, we will develop the optics to focus SNAs and test the optics using an already-developed position sensing focal plane and a neutral beam source that has already been established for calibration of previous neutral atom imagers.

Primary U.S. Work Locations and Key Partners





The neutral atom imager is based on the already developed soft X-ray camera for DXL/STORM. The figure is conceptual only in this context and does not represent an optical design.

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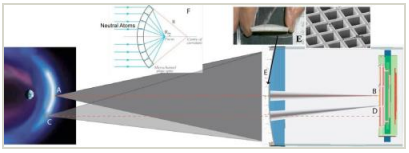
Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images



NAI Optics Concept
The neutral atom imager is based on the already developed soft X-ray camera for DXL/STORM. The figure is conceptual only in this context and does not represent an optical design.
(https://techport.nasa.gov/image/19257)

Project Website:

http://aetd.gsfc.nasa.gov/

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

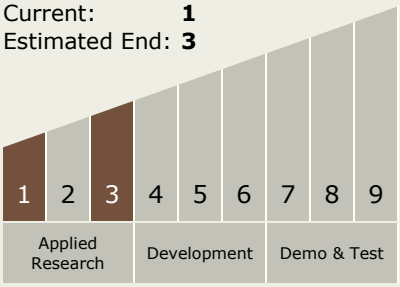
Program Manager:
Peter M Hughes

Project Manager:
Brook Lakew

Principal Investigator:
John W Keller

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes